

Individual factors affecting attitude toward knowledge sharing: an empirical study on a higher education institution

Attitude
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Abstract

Purpose – Higher education institutions (HEIs) are currently under pressure, driven by the knowledge society and the internationalization of institutions. Therefore, a positive attitude toward knowledge sharing is required. Considering that the knowledge-sharing attitude is motivated and executed mainly at the individual level, this study aims to examine the relationship between individual factors and the attitude toward knowledge sharing among professors and researchers.

Design/methodology/approach – Data was obtained from 176 completed questionnaires collected through LimeSurvey system. The analysis is based on quantitative methods where descriptive and inferential statistics were used. This study investigated the individual factors that affect attitude toward knowledge sharing among professors and researchers of a HEI.

Findings – The results identified that intrinsic motivation was the factor that most positively affects knowledge-sharing attitude. Given that intrinsic motivation is an activity moved by self-determination, and is free of external pressures or rewards, the finding may be related to the inviolable values, such as freedom and autonomy, existing in this context. Consistent with the concept of extrinsic motivation as a controlled motivation, this factor was not identified as affecting attitude toward knowledge sharing. Networking was the other factor that positively affects attitude on this institution.

Originality/value – In practice, this work can help the institution in defining strategies and developing future actions to promote a knowledge-sharing culture supported through an empirical study. In a theoretical perspective, this study contributes to the knowledge increase in the area, as little is known about the attitudes regarding knowledge sharing in HEIs.

Keywords Intrinsic motivation, Extrinsic motivation, Higher education institution, Knowledge-sharing attitude, Networking, Individual factors

Paper type Research paper

Introduction

Knowledge has become one of the most valuable drivers for exploiting core competencies and achieving sustained competitive advantage (Lin, 2007a). The advantage obtained by organizations depends largely on the ability of creating and sharing knowledge (Nahapiet and Ghoshal, 1998). Several studies have shown the existence of different factors that can affect people's attitude toward knowledge sharing (Kim and Ju, 2008), such as organizational, technology and individual (Lin, 2007b; Tohidinia and Mosakhani, 2010; Patel and Ragsdell, 2011).

Higher education institutions (HEIs) are knowledge-intensive organizations (Howell and Annansingh, 2013), where knowledge is their input and output (Ali *et al.*, 2014), which requires an attitude toward knowledge sharing. However, despite knowledge sharing being



one of their core missions (Fullwood *et al.*, 2013), the studies show that knowledge sharing does not emerge strongly within HEIs (Ramayah *et al.*, 2013). Their idiosyncratic characteristics, such as individualistic culture, knowledge as proprietary and source of differentiation, the specific needs of every researcher and academic freedom (Tippins, 2003; Tian *et al.*, 2009), make values and practices associated with knowledge sharing complex within this context (Rowley, 2000).

There is a limited previous research in HEIs context (Fullwood *et al.*, 2013; Ali *et al.*, 2014; Fullwood *et al.*, 2019), unlike the organizational environment, where there is an extensive reference of research studies on knowledge sharing. The small number of existing studies in this context shows little empirical research into knowledge sharing and factors that can affect it (Fullwood *et al.*, 2013; Ali *et al.*, 2014; Akosile and Olatokun, 2020), and little is known about the attitudes regarding knowledge sharing (Kim and Ju, 2008). Interestingly, the main studies on knowledge sharing in HEI context have been carried out in UK and Asian countries (Tohidinia and Mosakhani, 2010; Fullwood *et al.*, 2019). Clearly, only few studies have been conducted in Europe, and in particular in Portuguese institutions.

Considering that this issue is strongly related with the particularities of each country/region and, in particular with the culture of each institution, HEIs need to pay close attention to their characteristics in developing effective knowledge sharing programs among academics in this context (Al-Kurdi *et al.*, 2018).

Whereas, because of their characteristics, HEIs are endowed with relatively high level of individuality; this study examines and analyses the relationship between individual factors (i.e. intrinsic motivation, extrinsic motivation and networking) and the attitude toward knowledge sharing among the members (professors and researchers) of a Portuguese HEI.

In a practical perspective, this work contributes to the identification of relevant facts related to the individual factors that affect attitude toward knowledge sharing in the context of a Portuguese HEI, through the development of an empirical study. The results obtained can support the institution's management in the strategies definition and development of future actions, to promote a knowledge-sharing culture. In a theoretical perspective, this study contributed to the increase of the knowledge-sharing literature by investigating the attitude toward share knowledge from a different viewpoint.

Theoretical background

Knowledge sharing

As suggest by Kang *et al.* (2010), knowledge by itself is not a useful resource that creates value, exploits core competencies and achieves sustainable competitive advantages until it can be shared. Within the overall knowledge management context, knowledge sharing is a critical area that needs an appropriate attention from organizations. Knowledge sharing refers to the process of making individual knowledge, ideas, experiences or technologies available through the conversion into a form that can be understood and used by other individuals or communities according to their real knowledge needs (Smith, 2001; Kim and Ju, 2008; Tan, 2016). Van De Ven and Johnson (2006, p. 804) argue that users of knowledge “selectively interpret and use knowledge as it serves their own purposes, fits their unique situations, and reflects their relations with their practicing community.” Good knowledge-sharing process is one of the keys to create a knowledge base allowing the effective knowledge reuse (Bierly *et al.*, 2009; Stoyanov, 2014).

Knowledge-sharing process is associated to collaboration, as that can help to leverage and to create new knowledge, solutions, process or products (Kim and Ju, 2008; Tan, 2016).

Knowledge sharing can occur via written form, or in a social context through networking with other experts, or documenting, organizing and capturing knowledge from others (Kantola and Hautala, 2008; Wang and Noe, 2010).

Knowledge sharing in higher education institutions

HEIs, throughout their history, have played a crucial role in creating and disseminating knowledge (Chedid and Teixeira, 2017). They are consisted by a group of individual experts, which are simultaneously developers, users and bearers of knowledge (Omerzel *et al.*, 2011), with a high degree of specialization in certain disciplines, which are organized in different scientific domains (Tippins, 2003).

According to some authors (Fullwood *et al.*, 2013), there are three knowledge domains in HEI:

- organizational knowledge – documents, processes, procedures, strategies, etc.;
- teaching knowledge – teaching and learning resources and practice; and
- scientific knowledge – research information and activities.

Considering that the aim of this study is to understand the attitudes of professors and researchers toward knowledge sharing, the organizational knowledge is excluded from the study and it is concentrated in teaching and scientific knowledge.

HEIs have experienced intensified pressure (Omerzel *et al.*, 2011), influenced by the knowledge society and the globalization, with more interconnected entities and where knowledge, creativity and innovation are the essential elements for competitiveness, which requires the development of a positive attitude toward the management of knowledge.

Knowledge sharing emerges as the most important knowledge management process that HEIs should look forward to (Tan, 2016). However, Fullwood *et al.* (2013, p. 131) argue that there is an implicit knowledge-sharing culture in these institutions, this “culture is individualistic in nature and to some extent self-serving.” This individualistic characteristic is not suitable for the knowledge-sharing process, as knowledge increases in value and importance when shared and used (Tippins, 2003; Bierly *et al.*, 2009). Based on several authors, Howell and Annansingh (2013, p. 32) added that “while in the corporate sector, managing and sharing knowledge is considered a key to achieve and maintaining a competitive advantage, in higher education institutions this has primarily been ignored”.

Previous studies highlight some issues that can inhibit knowledge sharing in this context. Despite the existence of an implicit knowledge-sharing culture in these institutions, the prime loyalty of academic members is in to the discipline (Kim and Ju, 2008; Fullwood *et al.*, 2013), which inhibits the existence of any universal culture that influence their degree of engagement in knowledge-sharing activities (D’Este and Patel, 2007). Some studies present the evidence that higher education members put more emphasis on their individual achievements (Kim and Ju, 2008; Jolae *et al.*, 2014; Fauzi *et al.*, 2019) and they consider knowledge as proprietary and something that should not be shared freely (Tippins, 2003). Howell and Annansingh (2013) add that formal knowledge-sharing mechanisms such as conferences and publications are more recognized as a mean for competition rather than collaboration.

Factors that affect knowledge sharing

The knowledge-sharing literature has been identifying a wide range of factors that affect and impact the success or failure of the initiatives for sharing of knowledge (Tohidinia and

Mosakhani, 2010; Wang and Noe, 2010; Ali and Dominic, 2018). In general, these factors are summarized into three perspectives: organizational, technological and individual/personal.

Regarding the organizational perspective, Wang and Noe (2010) list a range of issues that affect knowledge sharing, such as culture and climate, management support, reward and incentives and structure. Among the organizational issues, Tohidinia and Mosakhani (2010) highlight the important role of a proper organizational climate and they consider that the lack of support might render useless the attempts of establishing knowledge-sharing processes.

Other authors place emphasis on the technological perspective considering it as one of the decisive factors in knowledge sharing (Tohidinia and Mosakhani, 2010). The use of infrastructures such as groupware, online databases, intranet and virtual communities (Lin, 2007b; Ali and Dominic, 2018; Ishrat and Rahman, 2020), enables individuals to directly or indirectly share knowledge with others (Bock *et al.*, 2005), and supports and makes available incentives and resources to use and up-date knowledge (Cabrera *et al.*, 2006). However, Desouza (2003) holds the view that technology is only one mean to foster knowledge and may not be a true indicator of knowledge-sharing behavior, as shared knowledge can be accessed by others even those not making contributions or usage of this knowledge (Cabrera *et al.*, 2006; Lin, 2007b; Wang and Noe, 2010).

Finally, based on the point of view of Nonaka *et al.* (2000) in which knowledge is personal and is related to human action, and that knowledge sharing is a very individualistic behavior (Bock and Kim, 2001), the individual perspective assumes a key factor that can affect attitude toward knowledge sharing (Bock *et al.*, 2005; Tohidinia and Mosakhani, 2010). As suggested by Ajzen and Fishbein (1977, p. 889) “attitudes are held with respect to some aspect of the individual’s world”.

Despite being knowledge-intensive organizations (Howell and Annansingh, 2013), which require an attitude toward knowledge sharing, the HEIs are characterized by a relatively high level of individuality and the cult of the individual expert (Omerzel *et al.*, 2011), where their members are “motivated” to use knowledge as source of personal advantage rather than as an organizational resource (Lin, 2007b; Nielsen *et al.*, 2013; Fullwood *et al.*, 2019). The individual characteristics of their members have a stronger impact than the characteristics of their departments or institutions (D’Este and Patel, 2007).

Table 1 shows an overview of factors affecting attitude toward knowledge sharing found in the literature review.

Individual factors

Knowledge sharing is a type of action that depends on experience, values, motivation and beliefs of the individual (Lin, 2007b). There seems to be a consensus among several authors that knowledge hoarding is a natural tendency rather than sharing (Bock and Kim, 2001; Bock *et al.*, 2005; Cabrera *et al.*, 2006; Howell and Annansingh, 2013). Individuals tend to hoard knowledge for various reasons (Bock *et al.*, 2005). To change this behavior, the existence of a strong personal motivation will be necessary, which promotes an individual attitude to share knowledge (Howell and Annansingh, 2013; Rutten *et al.*, 2016). Motivation means being energized or activated toward an end, and “orientation of motivation concerns the underlying attitudes and goals that give rise to action” (Ryan and Deci, 2000, p. 54). Lin (2007a) states in her study that intrinsic motivation (knowledge self-efficacy and enjoyment in helping others) and extrinsic motivation (expected organizational rewards and reciprocal benefits) influence individual attitudes to engage, or not, in knowledge-sharing activities.

| Author | Factors | Method/sample | Findings | |
|--------------------------------|---|---|--|--|
| | | | Affecting | Not affecting |
| Bock and Kim (2001) | Individual | 467 questionnaires of employees of 4 large public organizations in Korea | Expected associations and contributions | Expect rewards |
| Bock <i>et al.</i> (2005) | Individual and subjective norm | 154 questionnaires of managers from 27 Korean organizations | Reciprocal relationships and subjective norm | Extrinsic rewards and sense self-worth |
| Lin (2007a) | Motivational (intrinsic and extrinsic) | 172 questionnaires of employees from 50 large organizations in Taiwan | Reciprocal benefits, self-efficacy and enjoyment in helping others | Rewards |
| Yang and Chen (2007) | Cultural, structural, human and technical | 256 questionnaires from people of different positions, departments and industries in Taiwan | Structural, human and technical | Cultural |
| Kim and Ju (2008) | Relational and structural | 70 questionnaires of faculty members at a private university in South Korea | Perception and reward systems | Trust, openness, collaboration and communication channels |
| Tohidinia and Mosakhani (2010) | Individual | 502 questionnaires from 10 Iranian oil companies | Knowledge self-efficacy and reciprocal relationships | Extrinsic rewards |
| Fullwood <i>et al.</i> (2013) | Individual, organizational and technological | 230 questionnaires from 11 UK universities | Reciprocal relationships and rewards | Leadership, organizational structural and technology |
| Ramayah <i>et al.</i> (2013) | Individual and subjective norm | 447 questionnaires of academic members from 10 public universities in Malaysia | Extrinsic rewards, reciprocal relationships, sense of self-worth and subjective norm | – |
| Jolaei <i>et al.</i> (2014) | Individual and social networks | 117 questionnaires from 3 social science faculties in Malaysia | Social networks and self-efficacy | Extrinsic rewards |
| Tan (2016) | Individual, organizational, technological and communication | 421 questionnaires from 5 research universities in Malaysia | Trust, rewards, culture, system quality, openness and face-to-face communication | Self-efficacy, reciprocal benefits, management support and system infrastructure |

Table 1. Factors affecting attitude toward knowledge sharing

Intrinsic motivation

Intrinsic motivation behavior is based in the individuals' needs to be competent and autonomous (Deci and Ryan, 1985). Intrinsic motivation will occur only for activities that hold intrinsic interest for an individual, that is, activities which are performed out of interest and satisfy individuals' needs for competence (self-efficacy) and autonomy (self-determining) (Deci *et al.*, 2017). Studies have shown the role of intrinsic motivational factors in explaining individual behavior in several domains (Deci and Ryan, 1985), and Lin (2007a)

demonstrates that individuals' enjoyment in helping others significantly influences their attitude toward knowledge sharing.

This study proposes knowledge self-efficacy, and enjoyment in helping others, as intrinsic factors that motivate toward knowledge sharing in HEIs. According to social cognitive theory, knowledge self-produced factors influence an individual's attitude and behavior (Bock and Kim, 2001), whereas enjoyment in helping others derives from the concept of altruism (Lin, 2007a; Obermayer and Toth, 2019). For this reason, the following hypothesis is presented:

H1. Intrinsic motivation positively affects attitude toward knowledge sharing.

Extrinsic motivation

The extrinsic motivation contrasts with the intrinsic motivation, as its fundamental goal is to receive organizational rewards or reciprocal benefits (Lin, 2007a; Obermayer and Toth, 2019). As suggested by Deci and Ryan (1985, p. 35), extrinsic motivation "refers to behaviour where the reason for doing it is something other than an interest in the activity itself." Although, extrinsic motivation is considered as a pale and impoverished form of motivation (Ryan and Deci, 2000), many extrinsically motivated attitudes and behaviors, are important in the social world (Deci and Ryan, 1985). Organizational rewards are incentive systems which can motivate individuals to share their knowledge (Nonaka *et al.*, 2000; Yang and Chen, 2007; Obermayer and Toth, 2019). However, monetary compensation is not the only incentive for extrinsically motivating an individual behavior or attitude, being enhanced reputation, learning opportunities and career advancement are also relevant issues (Yang and Chen, 2007).

Reciprocal behavior in a HEI context can provide a sense of mutual collaboration, inspiring knowledge owners to improve their relationships with each other, which can ensure ongoing knowledge sharing (Lin, 2007a). Supposing that individuals believe they can receive rewards or reciprocal benefits by sharing knowledge (Fullwood *et al.*, 2019), and therefore they will develop more positive attitude toward knowledge sharing, the following hypothesis is proposed:

H2. Extrinsic motivation positively affects attitude toward knowledge sharing.

Networking

Kim and Lee (2006) additionally identify networking as an important individual factor that can influence knowledge sharing within communities and summarize that both formal and informal relationships and contacts are considered essential for knowledge sharing. Individuals do not work, learn or share knowledge in isolation (Wang and Noe, 2010). Networking is a circle in which individuals interact and connect with each other in different contexts, developing relationships and, in turn, sharing knowledge (Avram, 2006; Al Saifi *et al.*, 2016). This networking is supposed to enhance and encourage knowledge sharing (Du Chatenier *et al.*, 2009; Fauzi *et al.*, 2019), and to affect the extent of knowledge sharing (Al Saifi *et al.*, 2016), establishing an essential context to make knowledge sharing efficient and effective (Avram, 2006). Nahapiet and Ghoshal (1998) suggest that members of HEIs have recognized the important role of networking in promoting early access to new knowledge, facilitating its sharing and development, and often accelerating the progress of science.

Knowledge sharing depends on personal networks and the willingness of individuals to participate in the process (Cormican and Dooley, 2007; Kantola and Hautala, 2008). Kantola

and Hautala (2008, p. 55) add that “the functioning of a network is influenced not only by institutions’ but also by individuals’ own interests.” According to several authors, individuals with trend to establish networking demonstrate an attitude to share more knowledge and ideas (Kim and Lee, 2006; Fauzi *et al.*, 2019; Ishrat and Rahman, 2020). Riege (2005) considers the lack of networking as one of the knowledge-sharing barriers. Therefore, the following hypothesis is proposed:

H3. Networking positively affects attitude toward knowledge sharing.

As in this context knowledge sharing attitude is motivated and executed mainly at the individual level, this study examines the relationship among individual factors and the attitude toward knowledge sharing among the members of a Portuguese HEI. Attitude is expected to be responsible for a member’s sharing of knowledge among colleagues and others.

Research model

As the focus of this study is on attitude toward knowledge sharing, the conceptual research model is developed based on the theory of reasoned action formulated by Fishbein and Ajzen (1975). This theory posits that an individual intention is a key determiner of behavior, and it has been one of the most used to investigate the behavior concerning to knowledge sharing (Wang and Noe, 2010). However, Wang and Noe (2010) state that few studies have examined their antecedents, and Lin (2007a, p. 136) alerts to the “need to include other components to provide a broader view and a better explanation of human behaviours.” Thus, this study applies a framework which conceptually follows the theory of reasoned action and includes the motivational factors (intrinsic and extrinsic motivations), and networking applied by Jolae *et al.* (2014) and Kim and Lee (2006), as antecedents of the attitude. The following research model (Figure 1) was developed.

To test the model with the collected data, the correlation coefficients between all the variables were calculated, and a result of the linear regression was performed [attitude toward knowledge sharing = f (intrinsic motivation, extrinsic motivation, networking)].

Material and methods

Data collection

The study has been performed in the form of a quantitative research design by using online self-administered questionnaire. Link to a survey platform (LimeSurvey system) was made

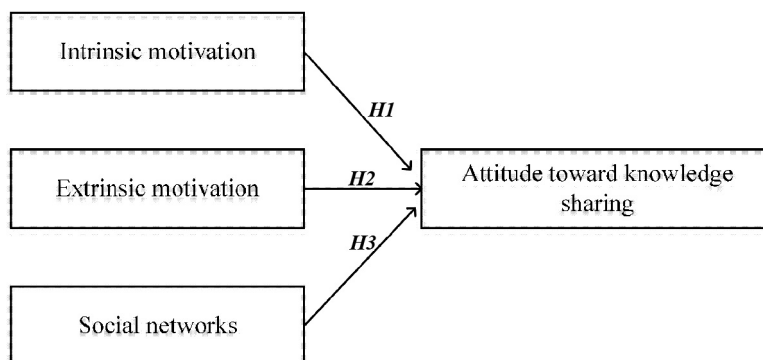


Figure 1. Research model for interpreting the hypotheses

available by email. As the respondents were dispersed in departments, schools and research units, the online survey was practical and convenient as a method of data collection. The questionnaires were administered anonymously to ensure confidentiality and the confidence of the respondents, preceded by a preliminary introduction that explained the objectives of the study.

The questionnaire was divided in three sections. The first section covered a set of questions eliciting demographic characteristics of the respondents. The second section comprised a set of questions in which variable items were adapted from previous studies in the knowledge-sharing context, namely, from Bock *et al.* (2005), Lin (2007a), Kim and Lee (2006) and Jolae *et al.* (2014). This set of questions had the objective to measure, through the opinion of each respondent, three independent variables (intrinsic motivation, extrinsic motivation and networking), and one dependent variable (attitude toward knowledge sharing) (Table 2). The response options for these items were presented to respondents on a five-point Likert scale, generally used to measure attitudes (Likert, 1932), where “1” corresponded to the least favorable level – “not agree at all” and “5” corresponded to the most favorable level – “fully agree.” For all the questions, the following option was also available: “do not know/do not answer.” The set of questions presented in the last section of the questionnaire were not used in present study.

The questionnaire was submitted to a pre-test before the launch. According to Adams *et al.* (2007, p. 136), “this is done to ensure that the questionnaire is clear to respondents and can be completed in the way you wish.” The pre-test was conducted on a small scale by a panel of six professors/researchers. At the same time, they were requested to evaluate some questionnaire issues. No major problems were reported that would require a major revision of the questionnaire. The comments received in the evaluation process focused on the writing of some questions and the formatting of the questionnaire. Subsequently, adaptations were made in accordance with the comments, thus improving the questionnaire understanding.

Sample

The population for this study consists of professors and researchers from a public HEI in Portugal. A simple random sampling method was used. This HEI (created in 1973) quickly became one of the most dynamic and innovative universities in Portugal. This institution is ranked for the sixth time in a row (2017) among the 100 best institutions of higher education in the world under 50 years old, in the Times Higher Education ranking. It is the only one of the youngest Portuguese HEIs to integrate the world’s top 100. It is one of the six largest institutions in Portugal, with the higher concentration into a single campus, and it is organized in departments through a matrix structure. This institution is organized into 16 different departments, 4 polytechnic schools and 18 research centers, according to a wide range of fields. It has about 15,000 students on undergraduate and postgraduate programs, and over 1,000 professors and researchers.

This study used the software G* Power 3.1.9.2, a flexible statistical power analysis program commonly used for the social and behavioral research (Faul *et al.*, 2007). The parameters used to estimate the minimum sample size were: 95% of statistical power ($1 - \beta$), effect size median (f^2) of 0.15 and 5% probability of error (α). Thus, according to the results, the minimum sample size would be 74, but to have a more consistent model it is interesting to have at least twice the value (Ringle *et al.*, 2014). As there were 176 valid responses collected, the multiple linear regression analysis seems to have sufficient power.

| Constructs/items | Relative frequency (%) | | | | | Mean | SD | Cronbach's α |
|---|------------------------|------|------|------|------|------|-------|---------------------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| <i>Intrinsic motivation (IM)</i> | | | | | | | | |
| IM1 | | 1.7 | 8.5 | 32.4 | 56.3 | 1.1 | 4.440 | 0.815 |
| IM2 | | 0.6 | 5.7 | 40.3 | 52.3 | 1.1 | 4.448 | |
| IM3 | | 1.7 | 5.7 | 40.3 | 51.1 | 1.1 | 4.460 | |
| IM4 | | 0.6 | 1.1 | 8.0 | 35.2 | 54.0 | 4.425 | |
| <i>Extrinsic motivation (EM)</i> | | | | | | | | |
| EM1 | | 4.0 | 10.8 | 21.6 | 27.8 | 35.2 | 3.383 | 0.770 |
| EM2 | | 1.7 | 4.0 | 17.0 | 38.1 | 38.1 | 3.800 | |
| EM3 | | 6.3 | 18.8 | 25.0 | 30.1 | 16.5 | 4.080 | |
| EM4 | | 11.9 | 18.8 | 36.4 | 17.6 | 5.7 | 3.329 | |
| EM5 | | 18.8 | 19.3 | 26.1 | 23.3 | 9.7 | 2.849 | |
| <i>Networking (NW)</i> | | | | | | | | |
| NW1 | | 1.1 | 10.8 | 28.4 | 35.2 | 24.4 | 3.627 | 0.756 |
| NW2 | | 1.7 | 11.4 | 23.9 | 36.4 | 25.6 | 3.710 | |
| NW3 | | 1.1 | 8.0 | 16.5 | 48.3 | 26.1 | 3.736 | |
| NW4 | | 7.4 | 21.0 | 28.4 | 26.1 | 12.5 | 3.903 | |
| <i>Attitude toward knowledge sharing (ATKS)</i> | | | | | | | | |
| ATKS1 | | 0.6 | 1.7 | 14.2 | 44.9 | 38.6 | 3.161 | 0.778 |
| ATKS2 | | 0.6 | 1.7 | 15.3 | 40.9 | 40.3 | 4.310 | 0.604 |
| ATKS3 | | 1.1 | 2.8 | 11.9 | 31.8 | 47.7 | 4.193 | |
| ATKS4 | | 0.6 | 4.5 | 31.5 | 61.4 | 1.7 | 4.201 | |
| | | | | | | | 4.280 | |
| | | | | | | | 4.566 | |

Notes: $n = 176$; Idk = I do not know; Ida = I do not answer

Table 2.
Items and descriptive statistics

Measurement

The analysis is based on applied quantitative methodology. The result analysis, based on a multiple linear regression analysis, was performed using the statistic software IBM SPSS 24.

The reliability of the items was measured by using Cronbach's alpha coefficient, which is regarded as a reasonable indicator of the internal consistency reliability of an instrument, mainly when using Likert-type scales (Gliem and Gliem, 2003). Multiple linear regression with stepwise approach was the estimation method used, which is appropriate in the case of multiple independent variables. The aim of the stepwise, as stated by Silhavy *et al.* (2017, p. 4), "is to maximize the estimation power using the minimum number of independent variables." The stepwise was the procedure used to select the independent variables which would be included in the regression model according to their statistical significance (Bryman and Cramer, 2005).

Results and discussion

Characterization of the sample

A total of 1,020 professors and researchers were contacted by email and requested to fill out the questionnaire. In total, 297 (29.1%) questionnaires returned, from which 121 with incomplete data was eliminated. As a result, 176 (17.3%) valid answers from 4 scientific areas (i.e. life and health, natural and environment, science and engineering and social and humanities) were used in the data analysis. The sample was gender balanced (50.6% female and 49.4% male). In total, 75.5% of respondents had more than 10 years of professional experience and 66.5% had more than 10 years of affiliation in the institution studied.

Construct validity

As multiple sources have been used to build construct measures, it was important to establish construct validity (Eisenhardt, 1989). Construct validity refers if there is the adequacy between the theoretical constructs, and the ones under study.

The means, standard deviations and Cronbach's alpha reliabilities for all constructs are presented in Table 2, along with the percentage of answers for each item. The Cronbach's alpha for each scale item exceeds 0.700, which is widely accepted as a good reliability score (Bryman and Cramer, 2005). Results indicated that the three independent variables, i.e. intrinsic motivation (0.815), extrinsic motivation (0.770) and networking (0.756), and the dependent variable i.e. attitude (0.778), reveal a good internal consistency reliability.

The convergent validity is the degree to which multiple items used to measure the same concept are in agreement (Hair *et al.*, 2014). The convergent validity was evaluated through the average variance extracted. Results indicated that all constructs – intrinsic motivation (0.645), extrinsic motivation (0.559), networking (0.659) and attitude (0.731) have an average variance extracted higher than 0.50, attesting a good convergent validity of the scales used (Chin, 2010).

The Fornell–Larcker criterion and the examination of cross-loading are dominant approaches for evaluating discriminant validity (Henseler *et al.*, 2015). However, Henseler *et al.* (2015) show, by means of a simulation study, this approach's superior performance by means of a Monte Carlo simulation study, in which they compare the new approach to the Fornell–Larcker criterion and the assessment of cross-loadings. Following the recommendation of Henseler *et al.* (2015), this study uses the heterotrait–monotrait ratio criterion to assess discriminant validity (Table 3). According to these authors, as the value is clearly below 0.90, discriminant validity has been well established between the reflective constructs.

The correlation coefficient and multiple linear regression analysis were used for interpreting the hypotheses shown in Figure 1.

Correlation analysis

The correlation measures the linear relationship between a pair of variables through degree of association (Bryman and Cramer, 2005). Table 4 presents the correlation coefficient matrix between the variables considered and shows that the three independent variables have a significant linear association with the dependent variable. As coefficients among independent variables were low ($r < 0.8$) (Bryman and Cramer, 2005), there were no inter-correlations with multi-collinearity among these variables.

Multiple linear regression

Multiple linear regression determines causal relationships between more than two independent variables and one dependent variable.

In this study, the presented model was designed to identify the proposed individual factors that affect attitude toward knowledge sharing. As a result of the regression analysis, it was possible to analyze that intrinsic motivation and networking has influence on attitude, as they were the variables that fulfilled the statistical criteria of the stepwise procedure, meaning that extrinsic motivation did not meet the criterion (Table 5). The

| Constructs | IM | EM | NW | ATKS |
|------------|------|------|------|------|
| IM | 1.00 | | | |
| EM | 0.47 | 1.00 | | |
| NW | 0.51 | 0.35 | 1.00 | |
| ATKS | 0.66 | 0.41 | 0.34 | 1.00 |

Table 3.
Discriminant validity of the constructs

| Constructs | IM | EM | NW | ATKS |
|------------|--------|--------|--------|------|
| IM | | | | |
| EM | 0.476* | | | |
| NW | 0.490* | 0.398* | | |
| ATKS | 0.621* | 0.384* | 0.462* | |

Table 4.
Correlation coefficients matrix

Note: *Correlation is significant at the 0.01 level (two-tailed)

| Model | Coefficients ^a | | | |
|----------|-----------------------------|-------|----------|-----------------|
| | Unstandardized coefficients | | <i>t</i> | <i>p</i> -value |
| B | Std. error | | | |
| Constant | 1.100 | 0.300 | 3.670 | <0.0005 |
| IM | 0.557 | 0.077 | 7.222 | <0.0005 |
| NW | 0.205 | 0.058 | 3.544 | 0.0010 |

Table 5.
Summary of regression analysis

Notes: ^aDependent variable: ATKS; $R^2 = 0.472$; adjusted $R^2 = 0.464$

variables included presented the highest correlation coefficient 0.621 and 0.462, respectively (Table 4).

The coefficient of determination (R^2) is the measure of the proportion of the variance of the dependent variable that is explained by independent variables. The coefficient of determination is 0.464, i.e. 46.4% of the dependent variable attitude was explained by independent variables intrinsic motivation and networking. This is denoted by the adjusted R^2 value in Table 5. For models with more than one independent variable, adjusted R^2 shall be analyzed (Bryman and Cramer, 2005).

Given that the independent variables are those that affect attitude toward knowledge sharing, the estimation model controlled as follows:

$$ATKS = 1.100 + 0.557 IM + 0.205 NW$$

Thus, every extra point of intrinsic motivation affects attitude toward knowledge sharing by 0.557, and every extra point of networking increases attitude by 0.205.

The model obtained is presented in Figure 2.

As intrinsic motivation and networking are found to influence attitude toward knowledge sharing, $H1$ (IM positively affects ATKS) and $H3$ (NW positively affects ATKS) were supported, and $H2$ (EM positively affects ATKS) was rejected. The values shown in parentheses are the p -values that assess the statistical significance between the constructs.

As expected, given that members of HEIs have inviolable values, like freedom and autonomy (Sporn, 1996) and intrinsic motivation is an activity moved by self-determination, and is free of external prods, pressures or rewards (Ryan and Deci, 2000), this factor was the one that most positively affects attitude toward knowledge sharing. Consequently, consistent with the concept of extrinsic motivation as a controlled motivation, this factor was not considered as one that affects attitude toward knowledge sharing. As argued by Akosile and Olatokun (2020, p. 413) “forced participation is not an effective policy in cultivating sharing behavior among academics”.

Networking was the other factor that affects attitude on this institution. Networking refers to the extent of individuals’ contact with other people. Knowledge is dynamic, and members of HEIs are critical actors involved in the creation and dissemination of knowledge. This form of interaction assumes an important role as it is not just an activity related to knowledge sharing but also a leverage of knowledge (Riege, 2005; Kantola and Hautala, 2008).

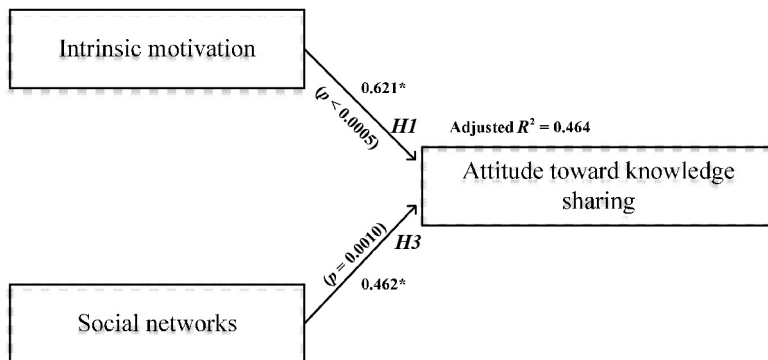


Figure 2.
Results of multiple
regression analysis

The results point to the importance of providing a dedicated and appropriate strategy for knowledge sharing. As the increase of knowledge is one of the principal focus of knowledge-intensive organizations, such as HEIs, knowledge sharing can be viewed as a fundamental process. However, in this context, the decisions heavily depend on individual attitudes and intrinsic motivation of academics.

Conclusion

HEIs are currently under intense pressure, driven by the knowledge society and the internationalization of institutions. This pressure demands a positive attitude that enhances knowledge sharing in these institutions and among their actors.

The purpose of this study was to examine and analyze the individual factors that affect attitude toward knowledge sharing among professors and researchers in the specific context of a public Portuguese HEI. The conceptual research model was developed based on the theory of reasoned action and included the motivational factors (intrinsic and extrinsic motivations), and networking as antecedents of the attitude.

The empirical study, based on a multiple regression analysis results, identified that intrinsic motivation and networking positively affect attitude toward knowledge sharing. However, extrinsic motivation did not significantly affect attitude. Taking into account the characteristics of this institution and of their members, the analysis of the results obtained shows that it is important to establish mechanisms based on intrinsic motivation and networking, to promote and encourage knowledge sharing and, consequently, improve the collaborative relationships.

In a practical perspective, this work contributes to the identification of relevant factors related to the individual factors that affect attitude toward knowledge sharing in the context of a Portuguese HEI, through the development of an empirical study. The results obtained can support the institution's management in the strategies definition and development of future actions, to promote a knowledge-sharing culture. Considering the results of this study, which show that members of this HEI prioritize the intrinsic motivation, the institution should establish mechanisms to promote effective knowledge sharing such as:

- encouraging members to share knowledge by organizing open discussions, forums, seminars or colloquiums, or applying communities of practice with the aim to create a collaborative sharing environment among members with a common scientific interest; and
- making the individuals' knowledge-sharing activities more visible to other members of the institution can enhance intrinsic motivation and so boost knowledge sharing and collaboration.

In a theoretical perspective, this study contributed to the increase of the knowledge-sharing literature by investigating the attitude toward share knowledge from a different viewpoint. Previous studies mostly focused on business organizations and only few studies based on empirical data have been conducted in Europe, and in particular in Portuguese HEIs. In this context, in a recent work of systematic review of literature, *Al-Kurdi et al. (2018, p. 239)* claim that "other regions and countries must invest in quality research in this area, as it is essential for the development of a nation's higher education system".

The findings of this study cannot be generalized, as the data collected is restricted to only one HEI. This is an exploratory study in which the authors plan on incorporating

other institutions in the future. However, this study was conducted in an institution that was a reference in Portugal and that according to its characteristics, the attitude toward knowledge sharing could be better tested. Future research studies should apply this study to other Portuguese HEIs to obtain more data and better characterize Portuguese HEIs' knowledge sharing. Then, it will be interesting to compare our results with the ones from HEIs from other countries and cultures. Analyzing and characterizing the knowledge-sharing practices among researchers and/or teachers at this institution will also be important.

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